PAINT REMOVAL SYSTEM FOR ARTIFICIAL GRASS

TECHNICAL FIELD

[0001] The present invention relates generally to a method and system for removing painted lines and other markings from an artificial turf surface.

BACKGROUND OF THE INVENTION

[0002] Traditionally, either permanent inlaid fibers of a contrasting colour or permanent paint have been used to create field markings on artificial grass surfaces. However, permanent inlaid fibers do not provide field flexibility, as conversion between marking arrangements of different sports is generally not possible. This significantly reduces the practicality of the artificial grass surface, as the field surface cannot easily be used for alternate purposes which may require different marking schemes. While the inlaid fibers, or sections of turf having markings defined therein, can be replaced to convert the artificial grass surface from one use to another, this is impractical, expensive and time consuming. As is painting over the inlaid fibers with a paint colour, such as green, which matches the colour of the field.

[0003] Painted markings are therefore much more practical, however they must be able to be removed when required, such that the artificial grass surface can be converted from one intended use to another. However, complete removal of the permanent paint applied to the fibers of the artificial grass surface has previously been problematic, often leaving "ghost" markings in place where lines or symbols have been removed. Further, the harsh scrubbing which is often used, using a wire brush or high pressure spray for example, in order to remove painted markings from the

artificial grass surface can be significantly damaging the synthetic grass fibers. This causes premature wear of the field surface in these regions. As lines or other markings are generally removed and repainted consistently in the same locations on the field surface, this wear causes visual indications of the removed markings in addition to the "ghost" paint markings. Paints which are less permanent are accordingly less difficult to remove, and therefore less wear is caused to the synthetic fibers as a result of the regular removal of markings in the same locations. However, while easier to remove, such more temporary paints can also more easily become dulled or worn away by rainfall or regular field use, thereby necessitating unwanted repainting. Such additional painting can cause the paint to cake onto the artificial grass surface, which can cause painted sections of the turf to become abrasive and slippery to players using the artificial grass surface. Additionally, the caked on paint can eventually cause permanent marks on the synthetic grass fibers which cannot be removed.

[0004] It would therefore be desirable to be able to easily and completely remove field markings, without causing undue wear to the synthetic fibers of the artificial grass, such that the playing surface can be efficiently modified as required to permit conversion between fields of different sporting activities without leaving residual paint from a previous marking scheme. Accordingly, the artificial grass surface can provide a multi-purpose athletic field which, at any one time, aesthetically appears to be dedicated to a single sport. By being able to remove all traces of previously painted markings, the overall appearance of the synthetic grass turf facility is enhanced without degrading the life of the synthetic fibers. The enhanced visual

appearance is especially important for fields to be used during televised events.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to provide a system and process for removing painted field markings from a synthetic grass surface.

[0006] It is another object of the present invention to remove painted field markings from a synthetic grass surface without causing undue wear to the synthetic grass fibers.

[0007] It is another object of the present invention to remove painted field markings from a synthetic grass surface such that substantially little visible paint residue remains thereon.

[0008] Therefore, in accordance with the present invention, there is provided a device for removing painted field markings from a synthetic grass surface including at least a sheet backing and a plurality of synthetic grass fibers extending upward therefrom, the device comprising: a displaceable vehicle adapted to move over the synthetic grass surface; at least one rotating brush operatively connected to the vehicle, the rotating brush being engageable with the synthetic grass surface such that bristles thereof contact the synthetic grass fibers of the synthetic grass surface; a solvent nozzle, disposed forward of the rotating brush and aligned therewith, for spraying a paint-dissolving solvent onto the synthetic grass surface in front of the rotating brush; and at least one water nozzle disposed on the vehicle adjacent the rotating brush for directing a pressurized water spray onto the synthetic

grass surface proximate to the bristles of the rotating brush.

[0009] There is also provided, in accordance with the present invention, a method of removing painted field markings from a synthetic grass surface including at least a sheet backing and a plurality of synthetic grass fibers extending upward therefrom, the method comprising the steps of: i) applying a paint-dissolving solvent to a region of the synthetic grass surface having the painted field markings thereon; ii) brushing the region using at least one rotating brush to abrade paint coated on the synthetic grass fibers; and iii) spraying the region with pressurized water.

[0010] Field markings on artificial infilled grass are accordingly easily removable by first dissolving the paint using an appropriate solvent, brushing the synthetic fibers using a rotating brush, and using pressurized water spray to flush the totally removed paint material from the synthetic fibers, down into and through the artificial grass infill pile and backing. This paint removal system substantially eliminates ghosting on the field surface after the line markings have been removed by minimizing any visible residual paint particles, such that whatever event is played on the field, the markings are unique and not overshadowed by lines from a previous event or sports activity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Further features and advantages of the present invention will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0012] Fig. 1 is a side elevation sketch of a device for removing painted field markings from a synthetic grass surface in accordance with the present invention.

[0013] Fig. 2 is a side perspective view of the device of Fig. 1.

[0014] Fig. 3 is a perspective view of the device of Fig. 1.

[0015] Fig. 4 is a perspective view of a device for removing painted field markings from a synthetic grass surface in accordance with a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] The paint removal device of the present invention permits removal of paint from a synthetic grass surface 13 having a plurality of synthetic grass fibers 15 extending upward from a sheet backing 17 and an infill layer 19 of particulate material interstitially disposed between the upstanding synthetic grass fibers 15. The paint removal device 10 is preferably used for removing painted field markings from a synthetic grass surface 13 used as a athletic field, such as in a stadium or other athletic facility. Field markings as defined herein is intended to include lines, logos, lettering and other painted markings applicable to a synthetic grass surface. The painted field marking removal device 10 accordingly permits a green or other coloured athletic field comprised of a synthetic grass surface 13 to be easily adapted for multiple uses. Using the paint removal device, all of the painted lines and other painted field markings applied to the synthetic grass surface 13 can be removed, such that substantially no visible remnants of the markings are left behind on the

field surface. The necessary lines and/or field markings for an alternate sport or use can be subsequently applied to the synthetic grass surface 13. The paint removal device is accordingly capable of removing more resistant paints which are designed to be long lasting and which are otherwise difficult to fully remove without causing damage to the synthetic grass fibers 15.

[0017] Referring to Figs. 1 to 3, the paint removal device 10, preferably adapted for removal lines from an athletic field surface, comprises generally a vehicle 12 having a forwardly extending cantilevered support beam 14 securely fixed thereto and projecting outward from one side of the vehicle 12. A brush engaging mechanism 16 is engaged with the support beam 14 and includes two pivoting links 18 pivotably connected at opposed ends thereof to the support beam 14 and a lower link member 20, such that a four bar mechanism is formed. Accordingly, the lower link member 20 can be raised or lowered relative to the synthetic grass surface 13 by pivoting the links 18 with respect to the support beam 14, which is fixed relative to the vehicle 12. The lower link member 20 thereby remains substantially parallel to the support beam 14 throughout the vertical movement thereof. An actuator 21 is provided to pivot the links 18 thereby raising and lowering the lower link member 20.

[0018] Three rotating brushes 24 are operatively connected to the lower link member 20, having downwardly extending bristles for rubbing paint from the synthetic grass surface 13 when the lower link member 20 is positioned in an operative position, whereby the bristles of the rotating brushes 24 are in contact with the synthetic grass fibers 15. While three rotating brushes 24 are provided in this

preferred embodiment, it is to be understood that as few as one single rotating brush can used. The number and size of rotating brushes employed will depend on the size of the paint removal device 10 and the size of the intended field installation for which it is to be used. Other factors which will affect the number and size of rotating brushes used include the time allocated to remove the painted field markings and the ambient air temperature. The rotating brushes 24 generally rotate about substantially vertical rotation axes, transversely aligned along the lower link member 20. However, as best seen in Fig. 2, the axis of rotation of each rotating brush 24 is eccentrically offset from the center of the circular rotating brushes 24. This causes each rotating brush 24 to cover a larger area of field surface as it rotates. Preferably, the rotating brushes 24 rotate in contra-rotating directions, namely each brush rotates in a direction opposite to that of the next adjacent brush. However, the brushes can all be rotated in the same direction. Rotating the brushes in contra-rotating directions however appears to provide the best paint abrading action, in order to better remove the paint from all surfaces of each synthetic grass fiber 15. The rotating brushes 24 can be made of any selected diameter, in order to permit selected width of paint to be removed in a single pass of the paint removal device 10. It is essential that the rotating brushes 24 comprise fine, non-damaging and very low abrasion bristles, such that the synthetic grass fibers 15 are not damaged over the course of the life of the field. The fine bristles of the rotating brushes 24 are designed not to damage the grass fibers, as repeated brushings at the same location can otherwise sufficiently damage the grass fibers to create permanent marks in these locations even when the paint has

been removed, making these paint-less regions even more obvious from a distance. Generally, the synthetic grass fibers 15 are composed of at least one of nylon, polyester, polypropylene, polyethylene or another plastic, and the type of rotating brushes 24 used should be selected such that the bristles will not cause any significant wear to these fibers. In a preferred embodiment, the bristles of the rotating brushes are approximately 2 inches in length and made of natural bristle fibers, which are less abrasive than synthetic brush bristles.

[0019] By applying a constant pressure on the links 18 of the brush engaging mechanism 16 using the actuator 21, a selected amount of down force can be maintained on the lower link member 20 to retain the rotating brushes 24 in contact with the synthetic grass surface 13. Each rotating brush 24 can also have an independent suspension mechanism provided to better accommodate uneven terrain, such that painted regions on the synthetic grass surface 13 will not be missed as a result of bumps in the field surface. The rotating brushes 24 are preferably driven by individual motors 26, although a single motor could be used to drive all of the brushes via a transmission system. Both the amount of down force applied to the rotating brushes 24 by the actuator 21 and the speed of the motors 26 can be selected and controlled by the operator, such that a desired paint removal rate can be achieved. This removal rate will also depend on the forward speed of the vehicle 12.

[0020] Connected to the rear of the lower link member 20, aligned behind the rotating brushes 24, is a static drag brush 28 which extends transversely relative to a direction of forward travel of the vehicle 12. As the drag brush 28

is fixed to the lower link member 20, it is accordingly raised and lowered with the rotating brushes 24. The bristles of the drag brush 28 are therefore only in contact with the synthetic grass fibers 15 of the synthetic grass surface 13 when the lower link member 20 of the brush engaging mechanism is in the operative position, wherein the rotating brushes 24 are also in contact with the synthetic grass fibers 15 ahead of the drag brush 28. The width of the drag brush 28 is preferably at least as wide as the rotating brushes 24. The bristles of the drag brush 28 are stiffer than those of the rotating brushes 24. The drag brush 28 acts to fluff up the synthetic grass fibers 15, which can become depressed by the rotating brushes 24, as the paint removal device 10 moves forward, This provides a better final aesthetic appearance of the synthetic grass surface 13 once the paint of field markings has been removed. Further, the drag brush 28 tends to break up the surface tension of any small pools of liquid which may form, used in the paint removal process, which can form on the synthetic grass surface 13. The drag brush 28 also acts to smooth out any infill which has been displaced by the pressurized water spray, which is described in further detail below.

[0021] As seen in Fig. 1, the paint removal device 10 preferably includes a forward projecting wand 34, extending ahead of the vehicle 12 and being aligned with the rotating brushes 24, the wand 34 having a nozzle 32 at an end thereof. The nozzle 32 is preferably adapted for spraying a selected paint-dissolving solvent onto the synthetic grass surface 13 well ahead of the rotating brushes 24. However, this forward nozzle 32 can also be used to spray water or a water-solvent mix onto the field surface. The solvent nozzle 32 is in fluid flow communication with a

solvent storage tank, preferably disposed on the displaceable vehicle 12 of the paint removal device. While the type of solvent used will depend on the type of paint to be removed, only environmentally friendly solvents are preferably used, as they are to be diluted, washed through the synthetic grass surface 13 and drained away. The solvent, or catalyst, used is selected such that it is capable of dissolving the line marking paint without damaging the grass fibers 13. The solvent also must not cause the removed paint material to become clumped together, as such dissolved paint clumps can remain retained in the infill layer 19, causing a residual visual effect of the removed line or field marking. The totality of the line marking material and the catalyst must be able to be flushed down through the turf pile and through the artificial grass surface by the pressurized water sprays described in further detail below. The solvent is applied to the painted region of the synthetic grass surface 13 ahead of the vehicle 12, such that the region is pre-soaked by paint-dissolving solvent before the rotating brushes 24 reach the region. This permits the field marking paint to begin dissolving before the paint is abraded by the rotating brushes 24, which allows for more efficient removal of the paint from the synthetic grass fibers 15. The paint removal device 10 depicted in Figs. 2 and 3 is shown with the forward the solvent spraying wand 34 removed. If desired, the paint-dissolving solvent can be independently applied to the field surface ahead of the vehicle 12, such as manually or using a separate solvent spraying applicator. This may be useful if the solvent is required to soak into the field surface for a longer amount of time or requires more time to react with the paint, before the rotating brushes are passed thereof to brush the

paint from the synthetic fibers. Additionally, the length of the solvent spraying wand 34 can be varied, such that the reaction time of the solvent acting on the paint before the arrival of the rotating brushes is controlled. This is also dependent on the vehicle speed and ambient air temperature.

[0022] While solvent is preferably applied on the synthetic grass surface by spraying using the solvent spraying wand 34 and the nozzle 32, alternate means of applying the solvent to the grass surface can also be used. This may be useful in situations where spraying the solvent is less practical, such as in very windy conditions for example. In this case, direct application methods can be used to apply the solvent to the synthetic grass surface. For example, a sponge-roller assembly can be used to directly contact the grass fibers to deposit the solvent thereon.

[0023] At least one nozzle 36 is provided on the lower link member 20 adjacent the rotating brushes 24 and oriented to project a spray of pressurized fluid downward into the synthetic grass surface 13 proximate to the bristles of the rotating brushes 24. Preferably, several nozzles 36 are provided, located at least between each of the rotating brushes 24, and are adapted to spray pressurized water into the synthetic grass surface 13 proximate the rotating brushes 24. A rear water nozzle 36 is also located behind the static drag brush 28. All of the water nozzles 36 are in fluid flow communication with a pressurized water source, such as a water tank disposed on the vehicle 12. The water nozzles 36 direct calibrated, high pressure sprays of water into the synthetic grass surface 13 to help the paint removal from the grass fibers 15 and in order to flush the dissolved marking paint down through the infill

layer 19 and through the bottom of sheet backing 17 of the synthetic grass surface 13. A relatively large amount of water is preferably used in order to ensure complete removal and disposal of the dissolved paint and the solvent through the grass surface, such that the area that has been cleaned of paint is thoroughly soaked and the volume of water carries the diluted paint deep into the synthetic grass pile and through the sheet backing 17. Preferably, hot water at a relatively high pressure is used to achieve best results. However, it is to be understood that the temperature must remain below the melting point of the plastic used to create the grass fibers 15. Also, the pressure must be calibrated such that it is not so high that the infill of the synthetic grass surface is significantly displaced. While the nozzles 36 disposed on the lower link member 20 adjacent the rotating brushes 24 are preferably used to spray high pressure water onto the synthetic grass surface, they can also be used to spray a mixture of water and paint-dissolving solvent, or can be individually fed such that one sprays only solvent and the others spray pressurized water. A surfactant can also be added to the water, to the solvent or to the mixture thereof. The surfactant improves the viscosity of the mixture and the dissolved paint, such that it can more easily flow down through the grass surface for drainage away therefrom. While flushing the dissolved paint and solvent down through the grass surface is preferably used, alternate means of removing the dissolved paint and solvent from the grass surface can also be used. For example, a large wet/dry type vacuum device can aspirate any dislodged or dissolved paint and solvent fluid mixture in order to completely remove it from the field surface. This may be useful in a particularly astringent solvent is required, or

if the paint is not completely dissolved and suspended in the solvent fluid.

[0024] Although the vehicle 12 is depicted in Figs. 1 to 3 as a ride-on type vehicle, a walk-behind type vehicle can also be used in order to better suit the needs of smaller venues. Such a scaled-down walk-behind unit may have fewer rotating brushes and may require less water nozzles.

[0025] Referring to Fig. 4, an alternate painted field marking removal device 50 is shown, which provides a wider paint removal system which is preferably adapted for removing logos or other relatively large painted surface areas from athletic field surfaces, such as end zone painted logos on a football field for example. The paint removal device 50 operates similarly to that of the paint removal device 10 of the first embodiment of the present invention. The larger area paint removal device 50 comprises a vehicle frame structure 52 disposed on castor-type wheels 54 such that the vehicle can be easily displaced on the field surface. To the main vehicle frame structure 52 is engaged a moveable sub-frame assembly 56 which can be raised and lowered relative to the main vehicle frame structure 52 using an engagement-disengagement mechanism, which includes link arm members pivotably linking the sub-frame assembly 56 to the main vehicle frame structure 52, and an actuator 72 which raises or lowers the sub-frame assembly 56. Three large diameter rotating brushes 64 are operatively connected to the sub-frame assembly 56 and are driven by individual brush drive motors 66. The three rotating brushes 64 preferably contra-rotating, each rotating in a direction opposite to that of an adjacent brush. However, the brushes can all be rotated in the same direction. In the preferred embodiment

shown, the rotating brushes 64 each have a diameter of approximately 20 inches, and are slightly overlapped such that a strip of paint approximately 56 inches wide can be removed as the vehicle moves forward. However, it is to be understood that the number of brushes and their size could be increased in order to provide a larger paint removing device, for example in order to speed up the removal of large areas of painted field markings. An individual suspension system for each rotating brush 64 is provided. This is important, as the relatively large, flat rotating brushes 64 are not individually suspended, they may skip over painted regions if the field surface is uneven.

[0026] A forward solvent wand 58 extends preferably transversely across the paint removal device 50 along the front edge thereof. The solvent wand 58 provides paint-dissolving solvent to several solvent nozzles 60 which spray the solvent onto the painted field surface in front of the rotating brushes 64. A transversely extending water wand 62 is also provided, and feeds a plurality of water nozzles 63 such that a large volume of pressurized water can be sprayed over the synthetic grass surface adjacent the rotating brushes 64 and at the rear of the vehicle.

[0027] Attachment points 51 are provided on the main vehicle frame structure 52 for engagement with another motorized vehicle, such as a small ride-on athletic field tractor or cart for example. This permits the larger painted field marking removal device 50 to be selectively engageable to a vehicle, for use when required. However, it is to be understood that the painted field marking removal device 50 could be permanently fixed to a self propelled vehicle such as that depicted in Figs. 1 to 3, for example.

[0028] During development of the paint removal apparatus of the present invention, the apparatus underwent several trials and iterations before arriving at the preferred embodiment described above. For example, a single rotating natural bristle brush was first tested on a synthetic grass surface having a 2 1/2 inch pile height, with four water nozzles located around the rotating brush. While results were nevertheless good, not all of the paint was completely removed. Two more brushes were then added, and adjacent brushes were rotated in contra-rotating directions, in order to ensure that the brushes made contact with as many sides as possible of the synthetic grass fibers. More high pressure water nozzles were also added around each rotating brush, and the solvent spraying nozzle was located far ahead of the first brush, such that the paint dissolving solvent was projected onto the field surface in sufficient time before the arrival of the brushes to be able to soak into the synthetic grass surface. The length of the bristles of the rotating brushes was further reduced to two inches. All of these changes gradually improved the effectiveness of the paint removal apparatus.

[0029] During experimental tests of the present invention, various different types of paints and solvents were used, in combination with the sprayed water and rotating brushes. Additionally, different combinations of the three elements of the present invention, namely the rotating brushes, the pressurized water spray and the paint-dissolving solvent, were tried. Tests were done that conclusively confirm that neither one part of the paint removal system works optimally without all three components combined together. Test were done using only a high pressure spray with water on the painted lines and a majority of the lines were not removed. Tests were done using the rotating brushes

exclusively with water spray and that was not successful. Tests were also done using only high-pressure water spray and solvent, which were also unsuccessful. However, when combining all three elements together, the high-pressure water spray, the paint-dissolving solvent and the rotating brushes, the system worked best to remove painted field markings from a synthetic grass surface.

[0030] During these tests, the use of a specially formulated paint which was less permanent was considered, such that the paint was more easily removable by means of either hot water, cold water, high pressure spray, or environmentally friendly solvents that could break down the binding qualities of the paint and therefore be more easily scrubbed away. However, following several trials, a few examples of which are outlined below, it was determined that regardless of the type of solvent or paint used, the most effective method for removing the paint was the combination of all three components of the present invention together, namely the rotating brushes, the pressurized water spray and the paint-dissolving solvent.

[0031] Many different solvents were tried, in varying quantities relative to the quantity of diluting water being used, in order to determine how much solvent was required to adequately move the paint from the field surface.

[0032] Example 1:

[0033] Simple Green™ solvents: Simple Green™ pure at the rate of 1 gallon for 70′ linear feet; Simple Green™ and water in a 50/50 mix did 120′ linear feet; Simple Green™ at the rate 1 gallon for 10 gallons of water.

[0034] Example 2:

[0035] Soy Solv™ solvents: Soy Solv™ pure at the rate of 1 gallon for 60' linear feet; Soy Solv™ 1 gallon for 1quart of water can do 65'linear feet; Soy Solv™ and water in a 50/50 mix can do 120' linear feet. This solvent left an oily film on the fibers.

[0036] Example 3:

[0037] Soy Solv II ™: Soy Solv II™ pure at the rate of 1 gallons for 70' linear feet; Soy Solv II™ 1 gallon per 1 quart of water can do 75' linear feet; Soy Solv II™ and water at the ratio of 50/50 mix can do 120' linear feet.

[0038] Example 4:

[0039] Soy Solv II Plus ™: Soy Solv II Plus™ pure at the rate of 1 gallon for 70' linear feet; Soy Solv II Plus™ 1 gallon per 1 quart of water can do 75' linear feet; Soy Solv II Plus™ and water at the ratio of 50/50 mix can do 120' linear feet. Soy Solv II Plus™ has an ingredient that enhances rinsing ability.

[0040] Example 5:

[0041] Graffiti Remover™ solvents: Graffiti Remover™ at the rate of 1 gallon for 70' linear feet; Graffiti Remover™ at 1 gallon per 1 quart of water can do 80' linear feet; Graffiti Remover™ and water at the rate 50/50 mix can do 120' linear feet.

[0042] The linear distance numbers are of course relative to the speed application and the nozzle opening. All of these solvents where tested using both cold and hot water for mixing and rinsing. Using hot water appears to work better than using cold water. Some other solvents tested include D9™, Gat™, and gasoline. Some solvents leave a slippery

oily film and do not dissolve fast enough. This is disadvantageous as the field cannot be used immediately following the paint removal process has been completed. Also, while some solvents dried non-slippery, a slight amount of moisture, such as from mist or dew for example, can cause the region to become slippery. Therefore, the relatively large amount of water which is sprayed on the synthetic grass surface by the present invention is important to ensure that the diluted paint and the solvent is flushed deep into the infill layer and through the sheet backing of the synthetic grass surface.

[0043] Tests were also conducted, using the different solvents, on different types of paint. Some of the paints tested include Pioneer™ paint, World Class™ paint, Sico™, Sherwin Williams™, Xerus™ coating, Liquid Chalk™, Krylon™ marking chalk and others. Methods of applying the paint to the synthetic grass surface were also experimented with, as this can affect the ability to subsequently remove it.

[0044] As a result, it was found that the spray pressure used to apply the paint is significant to the durability of the painted markings and to the effect produced on the synthetic grass surface, especially one having an infill layer between the synthetic grass fibers. If a very high painting spray pressure is used, most of the paint tends to push down through the top grass fibers and reaches the pile, or infill, leaving little paint on left on the fibers. Accordingly, using a low paint spray application pressure, between about 20-50 psi, appears to give the best result wherein the paint is deposited mostly on the fibers. This is a radical departure from common paint spraying practices, where a spray application pressure of greater than 1500 psi is commonly used. Further, spraying the

paint at an angle, preferably 45 degrees, dispenses the paint onto the synthetic grass fibers as desired. Painting with the spray nozzle in a vertical position causes much of the paint to be applied to the infill, which is not desirable. To achieve best results, two paint angled nozzles are used, opposite and facing towards each other. Additionally, the synthetic grass fibers are preferably first brushed up before the paint is applied, such that all of the grass fibers can be coated with paint.

[0045] As paint which is less permanent is necessarily more easily removed, trials were conducted to modify the paint used such that it contained less binder. However, with less binder, the paint adheres less well to the fibers. While this permits the paint to be more easily removed, it also does not last as long and become easily worn off, requiring frequent repainting, which is disadvantageous. While both more costly and time consuming, requiring frequent repainting means that when it comes time to remove the paint, there are more coats to remove, which makes the removal process more difficult. Therefore, it was found that varying the amount of binder in the paint did not greatly improve or facility the removal process in general. Paints are also now becoming available which remain durable for normal playing use, yet are more easily removable when desired. Some of the alternate line marking materials which were tested include liquid chalk, specially formulated liquid chalk, and specially formulated latex paint.

[0046] The paint removal devices 10 and 50 of the present invention, in either ride-on or walk-behind embodiments, can also have integrated field marking painting equipment thereon, such that the one device can be used both the

apply the field markings and to remove them when desired. Accordingly, the integrated device would have the ability to provide a high pressure spray for water and/or solvent application, and a relatively low pressure spray for applying the paint to the synthetic grass surface. Independent control of all sprayed materials is also provided.

[0047] The embodiments of the invention described above are intended to be exemplary. Those skilled in the art will therefore appreciate that the forgoing description is illustrative only, and that various alternatives and modifications can be devised without departing from the spirit of the present invention. Accordingly, the present is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.